

# DART Technical Notes:

Deck Height	.....	9.025"-Sportsman / 9.025", 9.325" & 9.500"- Comp
Bore	.....	4.000" or 4.125" unfinished
Main Bearing Size	.....	350 (2.45") 400 (2.65")
Main Caps	.....	Comp - Steel / Sportsman - Ductile
Weight	.....	197 - 205
Largest Recommended Bore	.....	4.185"
Camshaft Bearing Diameter	.....	SBC - 2.000"
Camshaft Position	.....	Standard SBC or +.391" Raised /+.434" Raised Option
Cylinder Wall Thickness, min.	.....	.275" @ 4.185" bore
Deck Thickness, min	.....	.675"

**\*IMPORTANT\*** All Raised cam Little M² Blocks will not have the oil drain backs drilled in the lifter valley. If you intend on running a wet sump oil pump you will need to drill the oil drain back holes in the lifter valley, we recommend 1/2" diameter holes. (See diagram on pg.5 for reference of locations.)

**NOTE:** If you are using aftermarket cam profiles you must use the correct components for the application.

**NOTE:** Be sure to check distributor to oil pump shaft clearance with distributor, intake manifold and oil pump installed on block.

**NOTE:** If a high volume oil pump is used it is highly recommended to restrict the oil feed to the top of the engine.

**NOTE:** The fuel pump pushrod bore is machined for a .500" rod. Be sure to check the clearance because of the inconsistencies in the diameters of push rods. For +.391" Raised cam blocks a +.200 SBC push rod is required (5.950" OA) Dart PN# PR200FP.

**NOTE:** Due to variations in lifter sizes and clearance preferences, most of our Engine Builder customers prefer the lifter bores sized on the small end of the specification. Sometimes these bores will need to be lightly honed.

**SPECIAL NOTE:** With a multitude of different crank, rod and piston combinations available it is important to check clearance of all moving parts, especially crankshaft counterweight and connecting rod to block. All parts must be checked before any type of machining or assembly is attempted.

It is good engine building procedure to ALWAYS check the fit of the distributor before any machining or cleaning is done.

Early stock SBC 2 hole oil filter adaptor is needed.

Standard SBC timing chain, timing cover, gear or belt drive can be used. (Sportsman block)

Special Timing gear is required for raised camshaft\*. (Comp Block)

\*When a mechanical fuel pump is used, a +.200 SBC push rod is required (5.950" OA) Dart PN# PR200FP

\*When a wet sump oiling system is used, a BBC oil pump driveshaft is needed.

Actual deck height will be .005" - .010" taller for additional machining requirements.

Standard SBC oil pan can be used.

Cam bearing OD should be deburred before installation.

When initially removing main caps, the caps & block should be deburred before reinstalling. This will insure that correct main size is maintained.

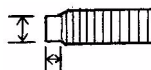
Standard SBC head studs or bolts may be used.

Head stud holes are blind. They do not go into the water jacket.

A thread sealant *must* be used on the head studs. Loctite #620 is recommended.

Studs should *never* be torqued into block. They should only be lightly snugged.

It is preferred that a bullet be machined on the end of the head stud where it bottoms in the block to center the stud before tightening. .350" OD x .150" Deep



Press-in freeze plugs are provided with comp series blocks only.

Press-in cam plug dia = 2 3/8" Dart P/N: 32510000

Timing cover and Oil pump dowel pins are .246" O.D. in dart blocks

The block is machined for a left hand dipstick. The boss is provided for a right hand dipstick but it must be drilled if needed.

**Dipstick Tube installation:** If an oil dipstick tube is used, after installation, fill the engine with oil and remark the dipstick indicator Full mark if necessary. In certain applications you may need to modify or bend tube to properly install it. The recommended part number is Trans-Dapt 9420

#### **OIL PUMP DRIVESHAFT**

On blocks with 400 main sizes you **MUST** use a 400 oil pump shaft which has a diameter of .425". If you are using an after market HD shaft or a 350 shaft, which are .481" diameter, you **MUST** machine the center of the shaft to .425" to clear the hole in the block. If this is not done, you may experience oil pump and/or distributor gear problems. The 400 main blocks have a hole .062" smaller than a 350 so the shaft hole will not break through to the rear main bore.

#### **DRY SUMP SYSTEM**

If a dry sump oiling system is used you must plug the inlet hole in the rear main cap or the hole in the block underneath the rear main cap. The Little M<sup>2</sup> Comp block has threaded inlets for dry sump oil feed machined in the front and rear.

There is also a boss provided for dry sump scavenge in the lifter valley area. The hole must be drilled & tapped for valley scavenging.

#### **PRIORITY MAIN OIL SYSTEM**

Oil can be directed through the front or the rear oil inlet.

Oil is directed to the main bearings first, then to the cam bearings.

If lifter restriction is needed, the 1/8" NPT restrictor must be installed in the center crossover. (See Diagram on pg4.)

**OIL PANS:** Most GM & aftermarket oil pans should fit on this block. Due to the massive size of our front & rear main caps we have machined the corners of the caps for oil pan clearance but with some oil pans you may still experience clearance problems. This will require additional machining or grinding on the corner of the cap. Oil pan clearance should be checked before assembly.

**Torque Specs: All Torque specs figured using CMD#3 Extreme Pressure Lube - (Dart P/N: LUBE)**

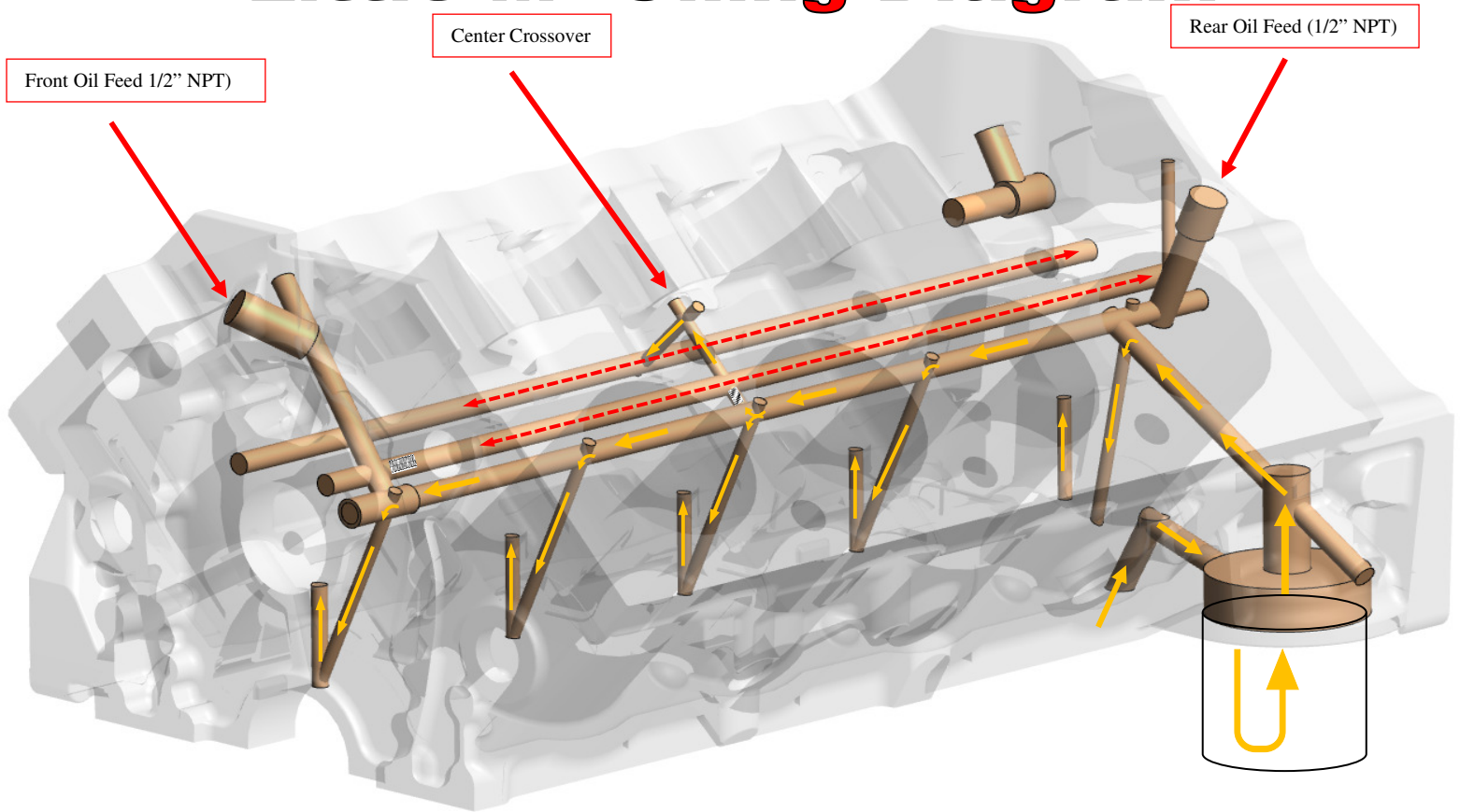
**Comp Block:**        1-5 - 7/16" bolts 65ft lbs.  
                             1&5 - 3/8" bolts 35ft lbs.

**Sportsman Block:**    1-4 - 7/16" bolts 65ft lbs.  
                             #5 (Rear) - 1/2" bolts 100ft lbs.

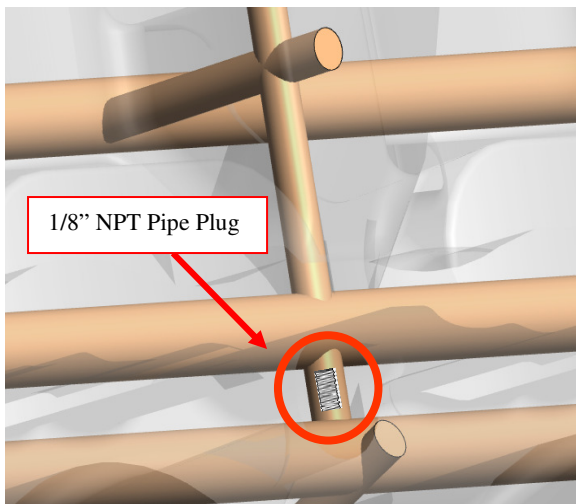
## **Dart** **Little M² Technical Notes:**

<b>Part#</b>	31181111 – 31182235 (Comp) & 31191111 - 31192211 (Sportsman)
<b>Material:</b>	Superior iron alloy
<b>Bore:</b>	4.00”or 4.125” unfinished
<b>Bore &amp; stroke:</b>	4.185” x 4.250” max w/stroker clearance machining and raised cam.
<b>Cam bearing bore ID:</b>	SBC - 2.00”
<b>Cam bearings:</b>	Special coated, grooved, w/3 oil holes
<b>Cam Bearing O.S.</b>	+ .010”, +.020”, +.030”
<b>Cam bearing press:</b>	.002”
<b>Cam journal OD:</b>	Standard SBC - 1.869”
<b>Cam Plug:</b>	2.375” dia. Cup plug
<b>Cylinder Wall Thickness:</b>	.275”min @ 4.185” bore
<b>Deck Height:</b>	9.025”, 9.325” & 9.500” +.005”to .008”/ – 0.00”
<b>Deck Thickness:</b>	.675” min.
<b>Fuel Pump:</b>	Mechanical pump provision
<b>Fuel Pump Pushrod:</b>	Standard Length or +.200” (5.950”) on Raised cam blocks
<b>Freeze Plugs:</b>	Press in cup plugs
<b>Lifter Bores:</b>	SBC .8427” - .8437”
<b>Lifters:</b>	<b>Must use +.300” tall lifters if using link bar lifters</b>
<b>Main bearing size:</b>	2.450” (350) 2.650” (400)
<b>Main bearing bore:</b>	(350) 2.6401” / -.001” (400) 2.8401” / -.001”
<b>Main Cap bolts:</b>	Comp - 7/16” & 3/8” dia. Sportsman – 7/16”dia.
<b>Main Stud Kit:</b>	Dart PN# 66311400
<b>Main Bolt Kit:</b>	
<b>Main cap press:</b>	.005”
<b>Main caps:</b>	Comp - Steel 4 bolt on all 5 Sportsman – Ductile 2 bolt front & rear.
<b>Main cap register:</b>	Deep stepped register on each side (no need for dowels)
<b>Oil system:</b>	Wet Sump - Priority main oiling (can use dry sump)
<b>Oil Pump shaft:</b>	350 main = Stock shaft (.481”OD) 400 main = Stock shaft (.425”OD) MUST machine aftermarket shaft <i>*Raised Cam blocks when using wet sump oiling require a BBC oil pump shaft</i>
<b>Oil Filter:</b>	Standard SBC filter and uses 2 bolt filter adapter.
<b>Oil Pan:</b>	Standard SBC oil pan
<b>Rear Main Seal</b>	350 main - STD seal / 400 main - Felpro# 2909
<b>Serial No.</b>	Left front & main caps
<b>Starter:</b>	Standard SBC
<b>Stud holes, Head:</b>	Blind holes
<b>Timing chain/gears</b>	Standard SBC or Raised cam components (for raised cam blocks)
<b>Timing Cover:</b>	Can use stock style cover
<b>Torque Specs:</b>	Comp - 1-5 7/16” bolts - 65 ft lbs 1 & 5 3/8” bolts 35 ft lbs
<b>w/ high pressure lube</b>	Sportsman – 1 – 4 7/16” bolts – 65 ft lbs Rear – 1/2” bolts 100 ft lbs.
<b>Weight:</b>	197-205

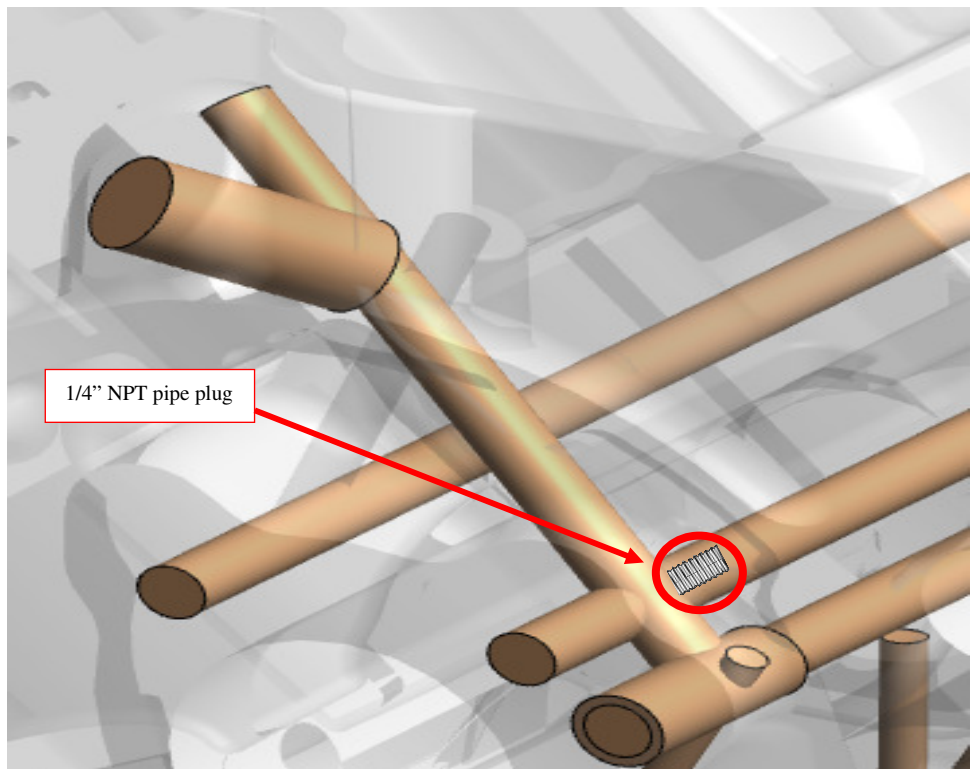
# Little M<sup>2</sup> Oiling Diagram



Oil flow comes in from the oil pump pickup, passes through the oil filter, up to the main oil galley, it is then diverted to the Main line (Crankshaft) bearings first (Priority main oiling) flows to the Cam bearings and then to the Lifter galleys secondary.

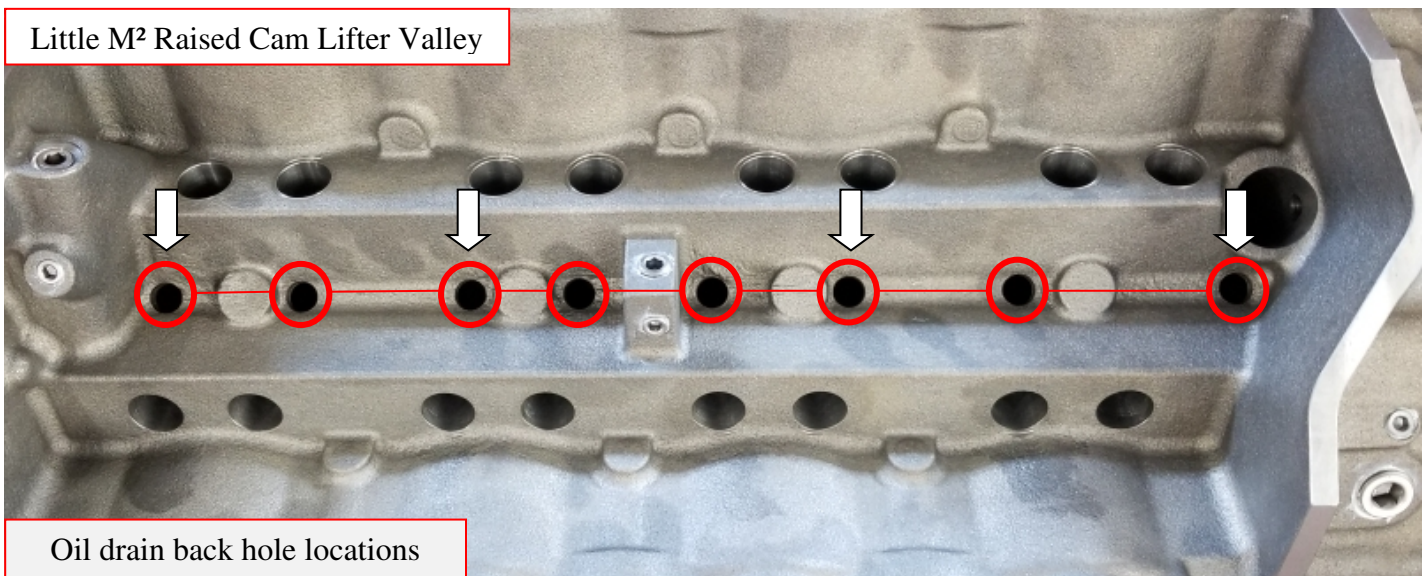
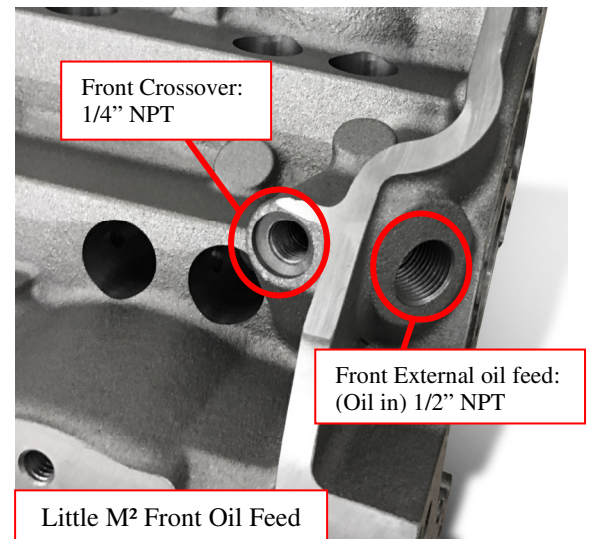
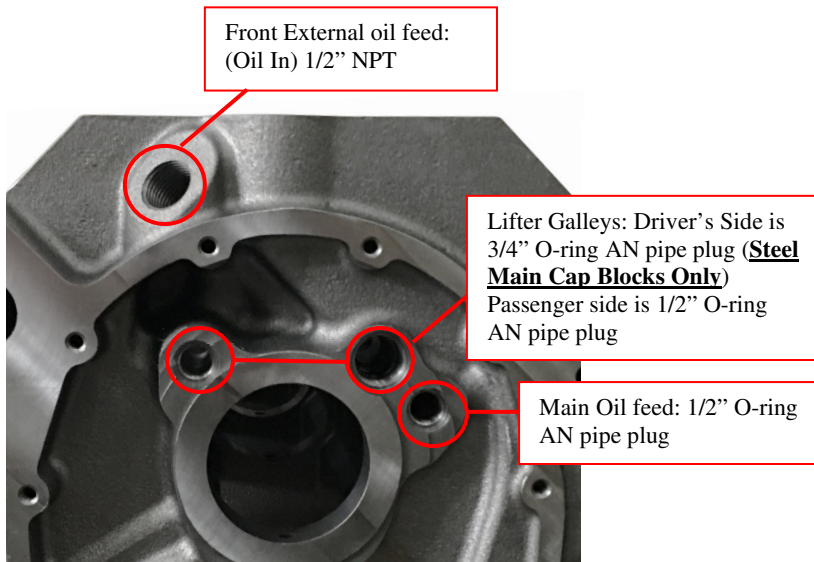


Oil Restrictor provision is in-between the main oil feed and the Drivers side Lifter galley located in the center crossover in the valley. 1/8" NPT



Little M<sup>2</sup> Steel cap blocks will have the front oil feed machining. There is a provision for a 1/4" NPT Pipe plug that is drilled and tapped behind the 1/2" AN fitting on the driver's side lifter galley. This would need to be plugged solid. Oil is then sent to the main oil feed which will feed the Main bearings first then to the center crossover and lifter galleys.

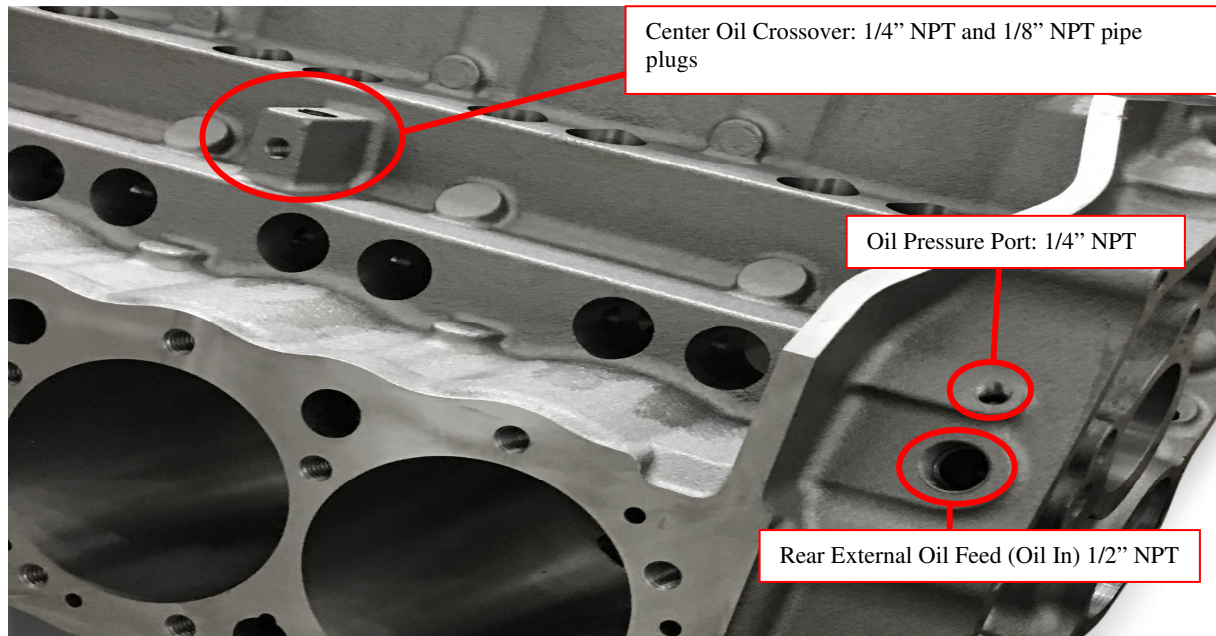




The oil drain back holes need to be drilled on the raised cam Little M² Blocks that are running a wet sump oil pump. We recommend drilling a minimum of 4 drain back holes 1/2" diameter (Arrows), but as many as 8 can be drilled if necessary as shown here.



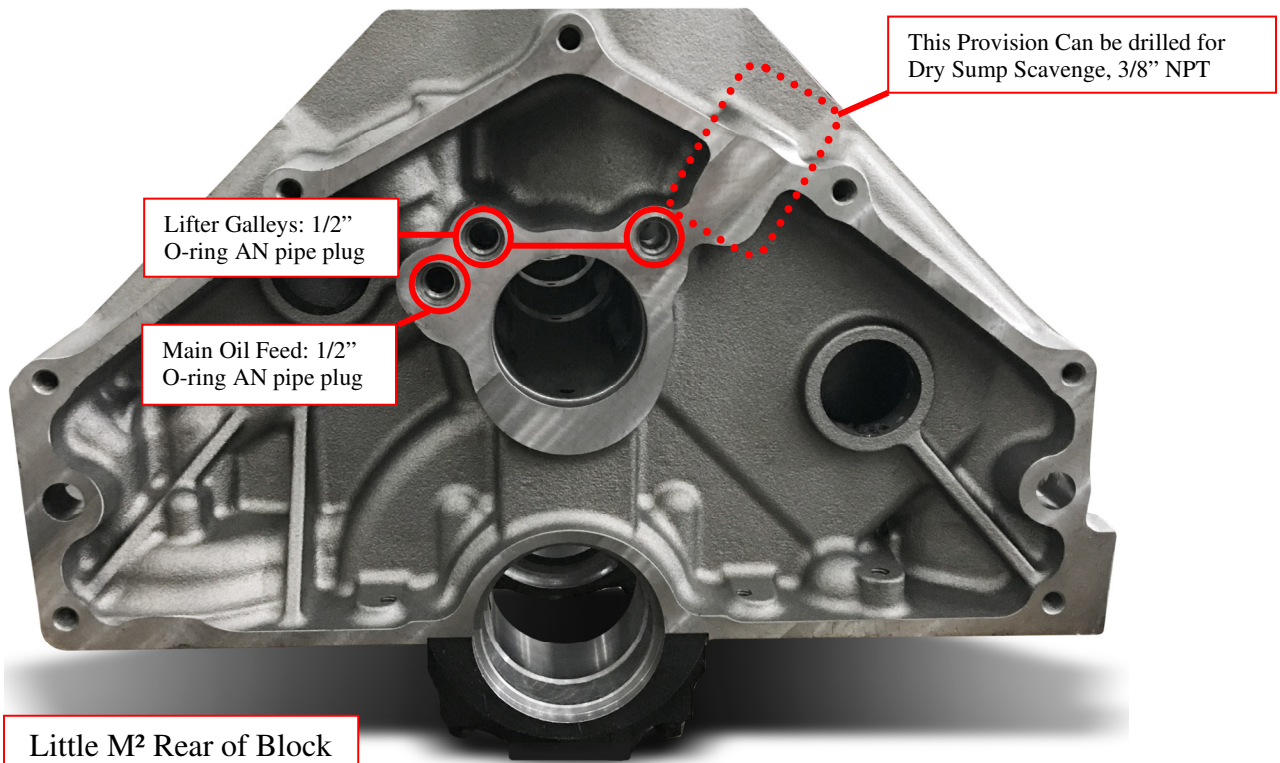
Little M<sup>2</sup> Non-Raised cam Lifter Valley



Center Oil Crossover: 1/4" NPT and 1/8" NPT pipe plugs

Oil Pressure Port: 1/4" NPT

Rear External Oil Feed (Oil In) 1/2" NPT



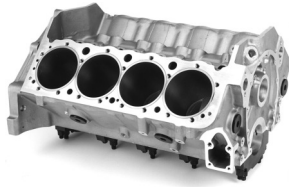
This Provision Can be drilled for Dry Sump Scavenge, 3/8" NPT

Lifter Galleries: 1/2" O-ring AN pipe plug

Main Oil Feed: 1/2" O-ring AN pipe plug

Little M<sup>2</sup> Rear of Block

# IMPORTANT



*This Block should be assembled only by experienced, professional engine builders.*

## INSPECTION

Upon receiving this block it should be thoroughly inspected for shipping damage.

Prior to machining and assembly please inspect the following items:

Cylinder bores - Oil passages - Deck surfaces - All threads

## MEASURING & MACHINING

- ❑ All initial measuring should be done before any machining has begun.
- ❑ Decks are CNC machined to standard deck heights. If you need a particular deck height always measure before machining.
- ❑ Main journals are finish line honed to the low to middle of the specification. They should be measured for your preference. If you have need for a different diameter you must realign hone this yourself.
- ❑ Crankshaft & rod clearance should always be checked before any machining is started. You need .060" clearance for rotating counterweights and rods.
- ❑ Due to variations in OD dimensions of the numerous lifter manufacturers, lifter bores are finish honed on the tight side of the tolerance to leave room for lifters that are larger than the standard.

## WASHING

- ❑ Final washing should be very thorough, paying particular attention to all oil galleys. Use hot soapy water and rinse with hot water first, followed by cold water which helps reduces rust.





CHAMPIONSHIP ENGINE COMPONENTS

**Make Sure you have Everything you need for your New Dart Block!**



**Assembly Lubricant  
P/N: 70000009**



**CMD#3 Extreme Pressure Lube  
P/N: LUBE**



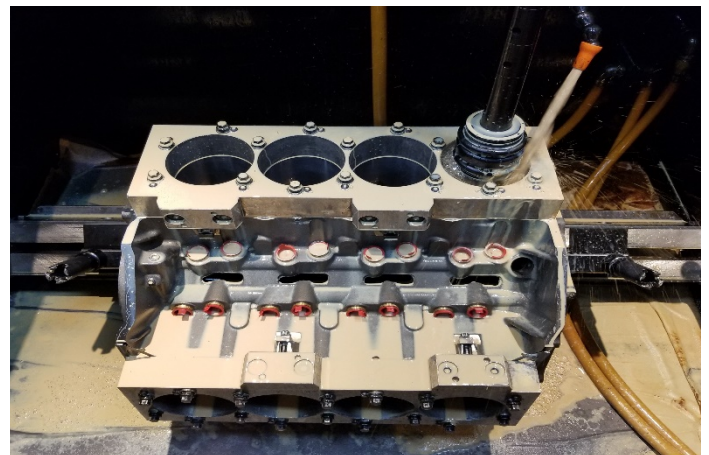
**Little M<sup>2</sup> Block Parts  
Kit P/N: 32000021**



**Little M<sup>2</sup> Main Stud  
Kit P/N: 66311400**



**SBC Top End Kits:  
P/N: 01111111 - 01311142**



**Dart Block Prep Service: P/N: BLOCKPRP**

- Final Lifter and Hone spec.
- Finish Machined to your specs.
- Finish Prepped and Washed.
- Cam Bearings, Freeze Plugs and Pipe plugs installed.

**Dart Machinery**

Call us @ 248-362-1188 or Visit our Website [WWW.DARTHEADS.COM](http://WWW.DARTHEADS.COM)